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LUIS MARDEN

A PANAMA BOY LISTENS TO THE MUSIC OF WIND PLAYING THROUGH HIS AEOLIAN HARPS

The dry winds of Herrerra Province, on the Pacific slope of the isthmus (Bulletin No. 3), continually draw sweet notes from these gourds and taut vines mounted on 15-foot poles.

Bulletin No. 1, February 5, 1951

Castles in Spain Held in Trust for Tourists

CASTLES in Spain are moving out of the realm of romance into the practical world of business.

Ten of Spain's many castles now are functioning as hotels. A number of others are being repaired under government sponsorship to attract travelers, especially those from the United States.

The traveler cannot expect to come upon the storied excitement of knights in armor, of jousts and tourneys, nor lovely ladies waiting in high towers for rescue. Yet he may find, in the great stone sentinels of the Spanish landscape, stirring reminders of harried chapters in the nation's turbulent history.

Combination Home and Fort

A Spain divided into Arab and Christian states for nearly eight centuries—from 712 until the year of America's discovery—saw in the castle a primary defense work and built a great many of them. As fortresses, the early castles were grim many-towered structures perched on hills, river banks, and coast lines like vigilant eagles ready to protect village and plain against approach of the enemy. Often whole towns were fortified with towered walls (illustration, next page).

By the 12th and 13th centuries, however, during the Christian conquest of the land, castles were built or remodeled to combine the features of the home with that of the fort. They reached a peak in strength and magnificence during the following two centuries as the regal abodes of powerful nobles. These families jealously resented any attempt to impair their absolute domain over the territories they claimed.

After the expulsion of the Moors in 1492, the reigning monarchs, Ferdinand and Isabella, began the long struggle to break the feudal power of the nobles. A major casualty in this struggle was the castle. The military value of the great stone piles was neutralized and they gradually became useless except for country residences, with many falling into a state of disrepair or ruin.

Olite and Coca Preserved

Today the Spanish government has taken under national trusteeship all the country's castles—from the crumbling ruins of Moorish fortifications to the romantic but modernized Alcazar at Segovia, whose light walls and rounded, peak-capped towers seem more a figment of childhood imagination than reality.

Saved for posterity and the tourist are such structures as Olite castle, completed in 1419 by Charles the Noble, of Navarre. Although partly destroyed, it is still one of the largest, most imposing castles in all Spain. During the days of Charles it boasted a terrace garden, a lion's den, an aviary, two chapels, and a church.

One of Spain's most unusual castles is Old Castile's Coca, built for

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WILLARD PRICE

MANCHURIA'S OLD MAN RIVER IS THE SUNGARI, PROVIDER OF TRANSPORT AND BRINGER OF FLOODS

The mighty stream flows northeast from central Manchuria to the Amur River on the Soviet border. Its last 700 miles are navigable. Here at Harbin workmen build up the dikes that hold back its waters from the flat plain. Harbin is the hub of Manchuria's rail system (Bulletin No. 5).

"Nine Years After," Singapore Fears Attack

SINGAPORE, "City of the Lion," fabled halfway house of world commerce, again is grimly facing the prospect of becoming a defensive pivot for the riches of southeast Asia.

As communist armies overrun much of Korea, invade Tibet, and carry war into Indochina, Singapore is reported once more preparing for all-out defense against possible assault. Its citizens remember only too well the lightning land-launched conquest of the city by the Japanese nine years ago this month.

Malaya Invaded Many Times

An island seaport which tips the south-pointing Malay Peninsula, thumb of continental Asia, Singapore has been Great Britain's gateway to the Far East for a century and a quarter. It has become the world's busiest trading post in rubber, tin, and quinine. Its naval base is one of the Far East's greatest.

Malaya has been invaded many times. Ages ago the ancestors of today's Australian aborigines and Polynesian islanders swarmed down the peninsula's length and used it as a bridge from continental Asia to then-unpeopled lands below the Equator. There followed countless migrant bands en route to Sumatra, Java, and beyond.

Ancient civilizations overflowing from India were next to come. A Buddhist empire, Sri Vijaya, gained a foothold on the Strait of Malacca, which to modern times has funneled Far Eastern sea trade between Indian Ocean and China Sea. Merchant-traders from India built a city called Singapura—City of the Singh, or Lion—in the place which earlier Malays had named Tumasik—Sea Town.

But Javanese warriors, broadening a Hindu empire, sacked this first Singapore about 1377 A.D. Thereafter, Malays avoided the island, believing its red soil cursed by the blood spilled there.

Million-capacity Melting Pot

In 1511 Portugal captured the Malay market, taking the port of Malacca which had been founded on the peninsula's southwest coast by a fugitive prince from Singapura. Malacca fell again in 1641 to the Dutch. Not until 1819 did Britain's Sir Thomas Stamford Raffles buy from native sultans a small, swampy island at Malaya's tip. The modern port of Singapore grew on Raffles's mangrove swamp.

Malaya tin, then rubber, made it rich. Singapore's population grew until today it is close to a million. It is a melting pot of Chinese, Malays, Indians, Arabs, Javanese, Burmese, Tibetans, Japanese, English, and Americans. Chinese constitute a large majority.

When World War II erupted in the Pacific, Singapore with its great naval base was considered an impregnable bastion. Coastal fortifications bristled with guns placed to repel a sea attack.

Japan struck swiftly by land and through the air instead. The mile-wide moat of Johore Strait between the city and the mainland failed to

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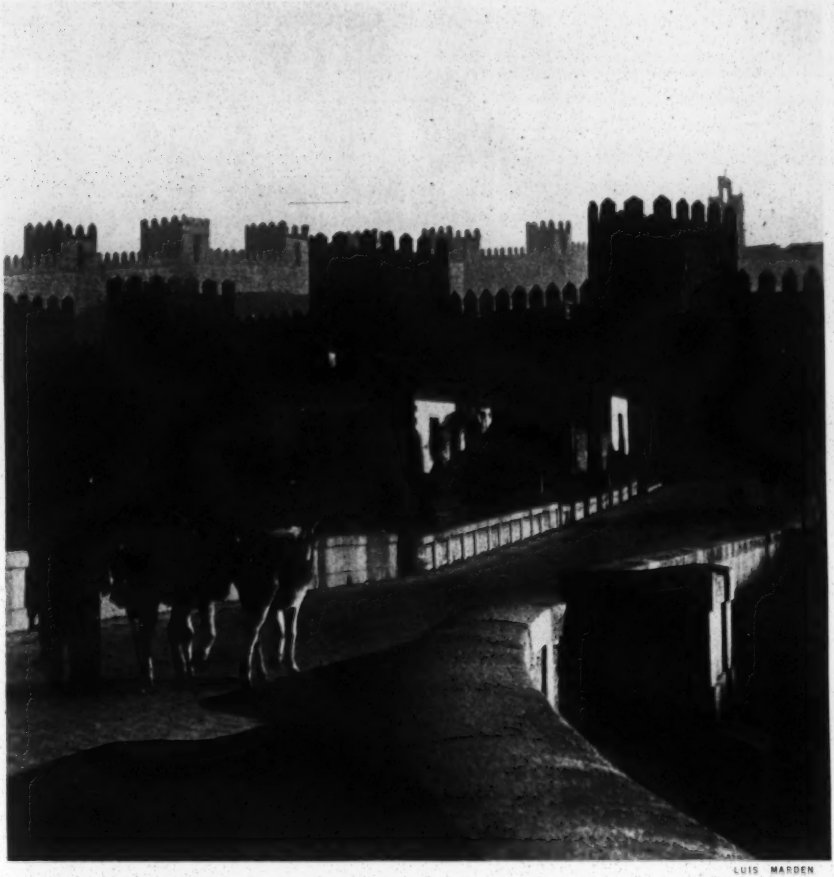
the Archbishop of Sevilla (Seville), Don Alonso de Fonseca. Its multitude of pink turrets and wavering lines of battlement have been said to suggest the natural "cathedral" of Utah's Bryce Canyon, rather than a work of man. Coca's architectural opposite—the magnificent Alhambra of Granada—is one of the finest examples of the nation's Moorish castles.

NOTE: Spain is shown on the National Geographic Society's map of Western Europe. Write the Society's headquarters, Washington 6, D. C., for map price list.

For additional information, see "Speaking of Spain" (with 27 color photographs), in the *National Geographic Magazine* for April, 1950; "A Skyline Drive in the Pyrenees," October, 1937*; "Turbulent Spain," October, 1936; "A Palette from Spain," March, 1936; "Pursuing Spanish Bypaths Northwest of Madrid," January, 1931; and the March, 1929, issue which is entirely about Spain. *(Issues marked with an asterisk are included on a special list of Magazines available to teachers in packets of ten for $1.00; issues unmarked are 50¢ a copy.)*

See also, in the GEOGRAPHIC SCHOOL BULLETINS for April 3, 1950, "Spain Is Europe's Second-Highest Land."



LUIS MARDEN

NO FAIRY-TALE ILLUSTRATION, BUT ÁVILA'S VERY REAL CASTELLATED WALLS RISING IN A SPANISH MIST

West of Madrid in Old Castile, Ávila is a nearly perfect example of the medieval walled city. The walls, 40 feet high and 10 feet thick, were built in the 12th century of materials taken from Roman ruins. Storks nest atop the towers.

Bulletin No. 3, February 5, 1951

First Panama Coast Study Since Columbus

TAKING up the study of a strip of Atlantic coast where Columbus left off is the assignment now being tackled by a National Geographic Society-Smithsonian Institution expedition.

The site chosen is Panama west from the Canal Zone to the Costa Rica border, on the north side of the isthmus's mountain divide (map, next page). The primary purpose, Dr. Gilbert Grosvenor, president of the National Geographic Society, said in recently announcing the project, will be an archeological reconnaissance of the wild, lush, tropical Atlantic-drainage area. It is a region about which Columbus wrote at considerable length following a visit there in 1502.

Husband and Wife Team

Leader of the group, which reached Panama City two weeks ago, is Matthew W. Stirling, director of the Smithsonian's Bureau of American Ethnology. The four-month field trip just starting will be Dr. Stirling's eleventh survey of pre-Columbian cultures in Middle America since 1938 under National Geographic-Smithsonian auspices.

With Dr. Stirling is his wife Marion, an accomplished archeologist in her own right. She has been her husband's associate on most of his trips. Rounding out the party are Robert Rands, a specialist in Middle American archeology, and Richard H. Stewart, National Geographic staff photographer, a veteran of past Stirling expeditions.

Plying westward from headquarters at Colón in local coastal craft, the scientists expect to make their penetrations of the forested jungle by mounting its rivers in native dugout canoes. The Rio Coclé del Norte, largest stream on the 200-mile coast, has tributaries that rise on the base of the Peninsula de Azuero, the remote area covered by Dr. Stirling's Panama research in 1949.

Other streams likely to serve as winding lanes to discovery are the Rio Indio, Rio Salud, and Rio Chiriqui, the latter named by Columbus. Columbus's more-than-passing interest in this coast, as proved by the contents of his log, was centered in its Indians.

Virgin Archeological Field

These natives, known as Guaymis, wore gold ornaments—possibly the first New World gold seen by Europeans, Dr. Stirling suggests. The gleaming decorations excited Columbus's men. They tried to take some of the gold and became involved in trouble with the Guaymis.

Since Columbus's 1502 visit, almost nothing has been written about the region. It is completely unknown archeologically, and little is known of the Guaymis, very primitive people who file their teeth to sharp points. The 1951 expedition is, therefore, exploratory, to fill this 449-year gap. The existence of pre-Columbian relics seems likely, Dr. Stirling believes, since Columbus noted that Indians were plentiful there in his time.

A great contrast in climate marks the two sides of western Panama's mountain divide. Moisture-laden Caribbean winds drench the coast north

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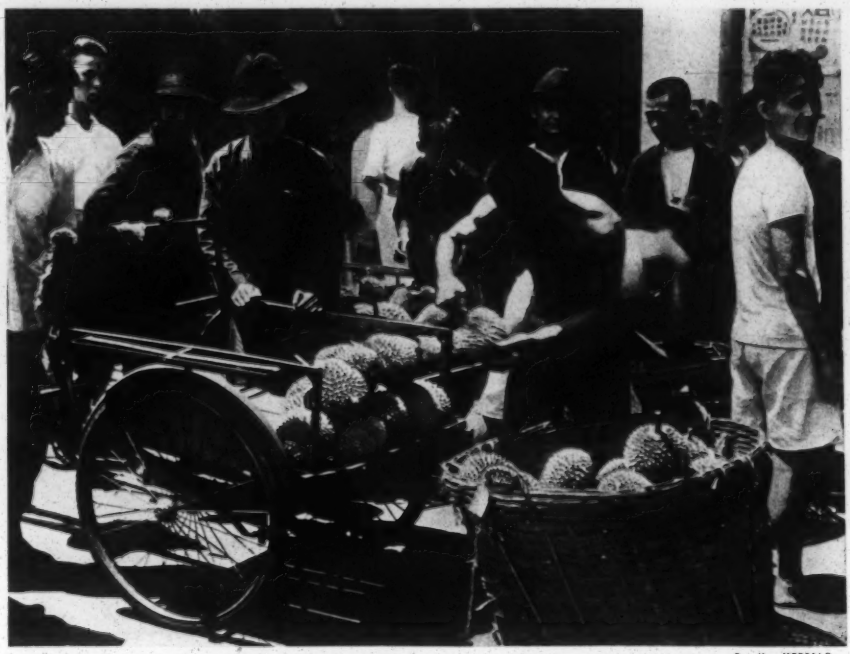
prove a major obstacle for the Japanese forces which had swarmed south along the Malay Peninsula. The fall of Singapore, on February 16, 1942, was a disastrous blow felt round the world.

This time there is little talk of an "impregnable fortress." Another overland attack could be stopped, Singapore's defenders believe, if enough troops are available to seal off the Malay Peninsula's narrow neck to the north. The naval base has been completely rebuilt, and jet planes are reported now based at the "City of the Lion."

NOTE: Singapore is shown on the Society's map of Southeast Asia.

For additional information, see "Life Grows Grim in Singapore," in the *National Geographic Magazine* for November, 1941*; "Behind the News in Singapore," July, 1940*; "Singapore: Far East Gibraltar," May, 1938*; "Fire-Walking Hindus of Singapore," April, 1931; and "Singapore, Crossroads of the East," March, 1926 (out of print; refer to your library).

See also, in the GEOGRAPHIC SCHOOL BULLETINS, October 6, 1947, "Cosmopolitan Singapore Gets New Status."



G. H. METCALF

DURIANS, SPINE-COVERED FRUIT PRIZED BY MALAYS, REACH A SINGAPORE STREET MARKET

This tropic fruit has a forbidding odor, but its meat is creamy and appetizing. It grows on high trees whose seeds, after being roasted, also find their way to Malay tables.

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Bulletin No. 4, February 5, 1951

Frivolous Snowflake Now Working for Man

THE tables have turned on that fluffy, often frivolous little child of nature —the snowflake.

Long irresponsible and playful, both a delight and a torment to man, the tiny winter visitor is being put to work at last. In the mountains of the west, snow is now recognized as a "billion-dollar" crop, the difference between disaster and prosperity for millions of people (illustration, next page).

Snow Helps Business and Pleasure

There melting snows provide water for reservoirs and irrigation ditches in eleven western states. So necessary are they to the economy that even reluctant snowflakes are being enticed to earth by weather-making airplane pilots who shoot moisture-laden clouds with pellets of dry ice and other agents. This wooing may not always work, but the effort is being made.

Across the nation, wherever ski enthusiasts gather in winter sports resorts, arrival of the snowflake means a successful season; non-arrival means financial loss. In western Canada an ambitious plan to open vast dry but potentially rich prairies for intensive cultivation hangs on a scheme to freeze a crust over snow fields in order to prevent evaporation of precious moisture.

Important as the snowflake has become to some phases of man's life, it took the 20th century to raise the curtain on its unique appearance and personality. Wilson A. Bentley, a Vermonter who became famous as the "Snowflake Man," may almost be said to have "discovered" the individual snowflake during his lifetime of snapping its picture with his camera.

He was the first to submit evidence in support of the theory that no two snowflakes appear exactly alike. Portraits by Bentley and others reveal, however, that in spite of an endless variety of patterns nature has held the snowflake to the six-sided or six-pointed figure.

General Types of Snow

Some flakes are of a "tailored" cut, roughly triangular and simply decorated with a few lines; others are more elaborate, with centers of dots and dashes hanging with pendants. Some look like exquisitely designed cuff links; still others resemble beautiful lacework. Highly regarded as perfect crystal architecture, snowflake designs are today being used in making jewelry, printing cloth, and decorating buildings.

Not only are individual snowflakes different, but there are general types of snow that vary from one another as well. Powder snow—dry, cold, loosely packed, and perfect for skiing—falls from lofty cirrus clouds during or just before severely cold weather. Fluffy snow, with large, lacy, wet flakes often matted together, descends when the temperature is just below the freezing point.

Both types change with the weather into snows termed sticky, wet, breakable, and granular. Wet snow, a soggy state reached after melting,

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of the ridge, causing the lush tropical jungle. On the Pacific side the land is dry, windy, and comparatively open (illustration, cover).

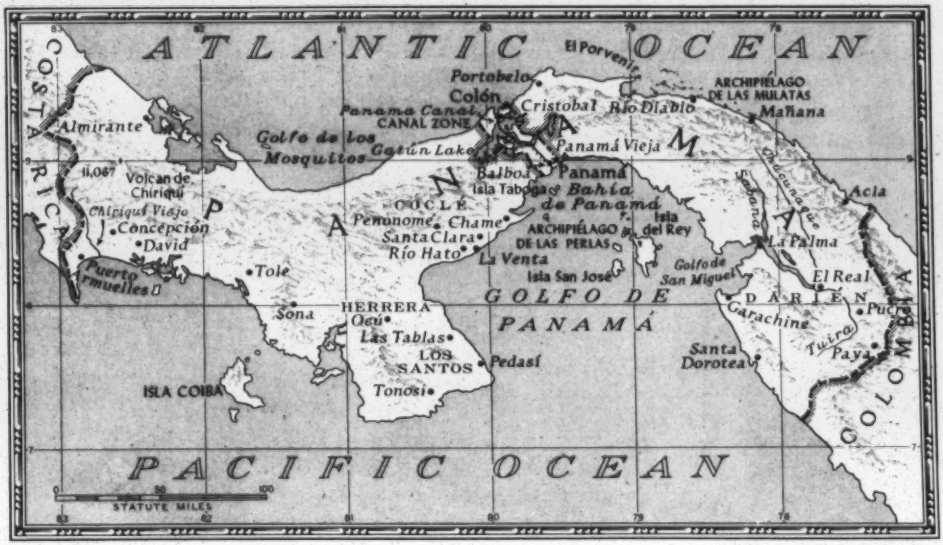
The explorers' stay in the jungle will extend until early May. En route southward by air, the group made visits averaging four days each in the capital cities of Mexico, Guatemala, El Salvador, and Costa Rica for the purpose of studying anything to be found in museums and libraries on the archeology of western Panama.

Bird life in the same area of the Isthmus of Panama is likewise unrecorded. Dr. Alexander Wetmore, secretary of the Smithsonian Institution, and Dr. Watson M. Perrygo, of the Smithsonian, both outstanding ornithologists, will later join the Stirling camp to catalogue the region's birds.

NOTE: Panama is shown on the Society's map of Countries of the Caribbean.

For further information, see "Exploring Ancient Panama by Helicopter," in the *National Geographic Magazine* for February, 1950; "Exploring the Past in Panama," March, 1949; and "Panama, Bridge of the World," November, 1941.*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, April 24, 1950, "Guaymi Indians of Panama Enjoy April Fiesta"; and "Helicopters and Archeology Mix in Panama," April 11, 1949.



DRAWN BY HARRY GARDNER, JR.

MOST OF PANAMA'S PEOPLE LIVE ON THE PACIFIC SLOPE OF THE ISTHMUS

The mountain spine of the snakelike land shields the Pacific side from the drenching rains of the Atlantic watershed. Wet winds blowing from the Caribbean have made such a jungle of the north coast that it virtually has remained unexplored since Columbus sailed along it in 1502. Now a National Geographic-Smithsonian Institution team is taking up where Columbus left off.

Geographic Oddities and Briefs

Lead is one of the oldest of metals. There is evidence that the Egyptians used it some 5,000 years ago, and there are numerous references to it in the Old Testament. In Exodus it is written that Pharaoh's hosts, destroyed while pursuing Moses and his followers, "sank as lead in the mighty waters."

A short-wave radio message can be sent around the world on less power than is required to operate an average size flashlight.

Manchuria Is Asia's "Cradle of Conflict"

IN serving as the springboard for Chinese communist aggression against United Nations forces in Korea, Manchuria is living up to its age-old reputation as a breeding ground of war.

Traditionally, this ancient land of the Manchus is known as Asia's "cradle of conflict." Its history of bloody on-and-off strife extends back centuries before the birth of Christ. Several somber chapters have been added to that history in modern times.

Soybeans and Wheat Are Chief Crops

Manchuria makes a man-size "cradle." It is almost twice as big as Texas. In 1940 it had 43,000,000 people, six times as many as Texas today. Although extensive coal and iron-ore deposits have helped make Manchuria the greatest industrial area of east Asia, it is primarily a farming country. In peace times four-fifths of its people get their living from agriculture. Soybeans, the leading crop, are processed into bean-cakes and bean-oil in numerous factories. These, as well as quantities of the beans in a raw state, were exported to Europe for food and fertilizer.

In the northern part of the country, where long winters cut short the growing season, wheat also is grown extensively. Corn, barley, and other cereals are raised. Grain is processed into flour in mills along the railroad, most of them at Harbin (illustration, inside cover). The mills were established by the Russians to feed their people who had been brought to the area. Some rice and cotton is grown in the south.

Timber from the forests of the eastern highlands was floated down the Yalu and the Sungari rivers to supply lumber for north China and Japan, as well as for Manchuria itself.

In the pre-Christian era, Manchuria was the homeland of fierce tribesmen who periodically overran northern China. About 246 B.C. the Emperor Chin Shih Huang Ti ascended the throne and shortly after began the Great Wall of China. Nearly 2,000 miles long, it was planned as a barrier to keep out the barbarians of Manchuria and Mongolia.

Chinese Overly Hospitable to Manchu Conquerors

For generations this "Maginot Line" was more or less successful. But it eventually became meaningless and in the 17th century the Manchus overwhelmed China. They set up a dynasty which ruled China from 1644 to 1912, when the Republic of China came into being.

The impassive Chinese, with an "all things pass" philosophy, literally were too hospitable for the Manchus' good. Gradually, by intermarriage, the northern tribesmen were absorbed into China's racial stream. Tens of thousands of Chinese later migrated to Manchuria, where the process of assimilation was repeated. Today pure-blooded Manchus in Manchuria are as scarce as Indians in Indiana.

By the 19th century Manchuria had become an international, rather than a tribal, feuding ground. Russian Cossacks and peasants infiltrated into the Amur River country on Manchuria's northern border; later

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is what the small fry deem most desirable for snowballs; the sticky variety is considered best for making snowmen. Breakable and granular snows are partially melted, then frozen over—the ice-snow mixture.

All snowflakes carry minute electrical charges which increase when they are broken into many particles, as when hitting against the wings of a speeding airplane. Lowest charges are carried by powdered snow; highest by fluffy flakes. Recent studies have revealed that these electrical charges are responsible for troublesome static on the radios of planes flying through snowstorms.

NOTE: For additional information, see "Sno-Cats Mechanize Oregon Snow Survey," in the *National Geographic Magazine* for November, 1949; and "Magic Beauty of Snow and Dew," by Wilson A. Bentley, January, 1923 (out of print; refer to your library).

See also, in the GEOGRAPHIC SCHOOL BULLETINS, November 7, 1949, "Snow Survey Helps West Outwit Drought."

CALIFORNIA DIVISION OF WATER RESOURCES

HOW MUCH IRRIGATION WATER NEXT YEAR? THEIR FINDINGS WILL GIVE THE ANSWER

Such parties tramp over western mountains with long aluminum tubes. At intervals they shove a tube through the snow to the ground and record the depth. Then they weigh the snow-filled tube to determine water content. Compiling the results, estimates are made of the expected spring runoff.

Geographic Oddities and Briefs

The overland trails of the Indians, worn deep long before the white men came to America, were remarkable for following the shortest and easiest way possible between various points. So efficient, in fact, were the old wilderness routes that practically all of today's transportation lines east of the Mississippi are based on them.

The queenly pearl, always in fashion and extensively imitated, is the only precious gem to come from the sea, and the only one produced by a living process.

The area of the Pacific Ocean is about the same as the combined extent of the Atlantic, the Indian, and the Arctic Oceans; and about 21 times the size of the continental United States.

Russia acquired Port Arthur and Dairen, Yellow Sea ports on the Liaotung Peninsula. The Japanese also began edging into southern Manchuria from Korea. After defeating Russia, Japan took Port Arthur and Dairen and began construction of the vast southern Manchuria railway system.

Manchuria was then—as it is today—nominally Chinese territory. In 1931 the Japanese used a bomb explosion on the railroad near Mukden as pretext for a sudden military action. They threw out the Chinese rulers and proclaimed the puppet state of Manchukuo.

In 1945 another war ravaged Manchuria's blood-stained soil. Russian troops slashed through Japan's Kwantung Army in the final days of World War II. They looted factories and demolished equipment.

Before Allied political pressure put the Russians out, they had made northern Manchuria a haven for Chinese communists. Chinese nationalists fought these revolutionaries for long months until Chiang Kai-shek and his forces were ousted from Manchuria and from China proper.

Today the Russians control Port Arthur and Dairen and are "partners" with Chinese communists in Manchuria's railways and industries.

NOTE: Manchuria appears on the Society's map of Asia and Adjacent Areas.

See also, in the *National Geographic Magazine* for March, 1947, "In Manchuria Now"; "Japan Faces Russia in Manchuria," November, 1942*; "Here in Manchuria," February, 1933; "Byroads and Backwoods of Manchuria," January, 1932; and "Manchuria, Promised Land of Asia," October, 1929; and, in the GEOGRAPHIC SCHOOL BULLETINS, December 4, 1950, "Manchuria Holds East Asia Industrial Heart"; and "Vast Manchuria Once Again a Pawn of War," November 22, 1948.

WILLARD PRICE

FROM BALCONY SEATS ON CHINCHOW'S WALL, CHINESE BOYS WATCH A BASKETBALL GAME

Peaceful prewar American influence in Manchuria gave this game of American origin to the boys of the old walled city of Chinchow, just north of Dairen on the Liaotung Peninsula. American missionaries introduced this popular sport, along with such useful and entertaining inventions as plows, phonographs, bicycles, sewing machines, and clocks.